

## New skeletons from the Age of Dinosaurs answer century-old questions

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Reconstruction of the aetosaur, Typothorax coccinarum, in a Triassic landscape based on skeletons from the Bull Canyon Formation of eastern New Mexico. (Artwork by Matt Celeskey.)

(PhysOrg.com) -- More than 100 years ago paleontologist E. D. Cope of "Dinosaur Wars" fame found a few fragmentary bones of a reptile in the deserts of New Mexico. He named the reptile Typothorax.

A century later Typothorax, which belongs to a group of reptiles called aetosaurs, remained something of a mystery, known mainly from pieces of armor, a few limb bones, and some sections of tail. Now, thanks to two remarkably complete skeletons discovered by volunteers and described in the latest issue of the Journal of Vertebrate Paleontology, <u>paleontologists</u> are finally revealing what Typothorax really looked like, how large it was, how it walked, and myriad other questions. Typothorax



is also one of the last large herbivores to evolve in the Late Triassic, before dinosaurs would come to dominate the planet.

Reminiscent of giant armadillos, aetosaurs were widespread during Late Triassic times (230 - 200 million years ago). The largest species of aetosaur grew up to 5 meters long, although the two new specimens, representing a species called Typothorax coccinarum, were smaller growing up to 2.5 meters long. All were covered by a protective armor of overlapping bony plates, but some species sported massive spikes protecting the neck region — an additional deterrent to any hungry predator. Fragments of the characteristic bony armor are well known to paleontologists, but complete specimens of any aetosaur are very rare and none were known for Typothorax prior to the discovery of these specimens. The <u>ornamentation</u> on the plates varies from species to species and paleontologists have long recognized them as a diverse and important group of plant eaters living alongside some of the earliest dinosaurs. However, because of the rarity of more complete material they remain something of an enigma. Now we can say a lot more about these strange creatures which Dr. Andy Heckert, the lead author of the study and a geology professor at Appalachian State University, regards as an "animal designed by a committee combining a crocodile with a cow and armadillo."

The two new discoveries from New Mexico are providing scientists with a clearer picture of their way of life. "We now know that some previously established ideas about these animals were mistaken," said Heckert. "For the first time we can get a realistic estimate of the size of these animals, and at only 2.5m [~7 feet) and about 100kg (225 lb) they are not as large as previously thought. We also know that some of the bony spikes that were thought to run down the sides of the armor actually surrounded the cloaca." The new specimens show that the body was completely enclosed in bony armor even to the extent of having a series of tiny overlapping plates extending down each leg, and onto the



hands and feet. The front limbs apparently sprawled, but the hind limbs were much larger and upright. "I doubt professor Cope would have ever imagined this animal quite this way," said Heckert, "one really interesting feature is that the front half of the <u>skeleton</u> is so slender we probably would have thought it belonged to a juvenile if it weren't articulated to the rest."

The new specimens are also providing exciting new information about the way these animals moved. Fossil skeletons with complete hands and feet are so rarely preserved that it is very difficult to confidently match a skeleton to the maker of any particular trackway. However, the exquisitely preserved feet in the new specimens demonstrate for the first time that trackways known as Brachychirotherium were almost certainly made by aetosaurs. "Brachychirotherium tracks are known from various localities around the world, and they are an almost perfect match to the arrangement of bones in the aetosaur foot," said Dr. Spencer Lucas, curator at the New Mexico Museum of Natural History, where the specimens are now on display, and another member of the team. "We now know that the front legs of aetosaurs sprawled to the sides, but their back legs were more robust and pillar-like." With their short and stubby necks, blunt-nosed skulls, and small leaf-shaped teeth, these distant relatives of crocodiles may also have grubbed around in the soil looking for succulent roots.

Both specimens were found by volunteers at the New Mexico Museum of Natural History and Science. The first, by Paul Sealey in the late 1980s, and the second by retired U.S. Air Force major Scott Sucher on the so-called Badlands Ranch in 2005. Several students from Appalachian State University got their first taste of paleontological excavation helping excavate the second specimen in 2006, and another volunteer, Bill Ortman, spent years cleaning and gluing the second specimen back together to make this research possible "The important contribution of amateurs to our science cannot be underestimated," said



Lucas. "As the Badlands erode we look forward to many more exciting new finds that will contribute to our understanding of the world at this important time in its history."

**More information:** Heckert, A. B., S. G. Lucas, L. F. Rinehart, M D. Celeskey, J. A. Spielmann, and A. P Hunt. 2010. Journal of Vertebrate Paleontology, volume 30, No. 3. [Featured Article] <u>www.vertpaleo.org</u>

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